4.2 Angle Measures of Triangles

Goal Find angle measures in triangles.

VOCABULARY

Corollary

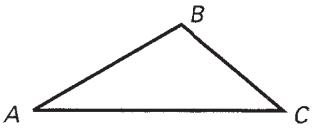
Interior angles

Exterior angles

THEOREM 4.1: TRIANGLE SUM THEOREM

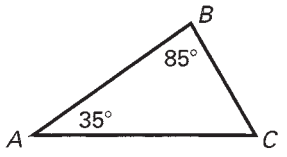
Words The sum of the measures of the angles of a triangle is _____.

Symbols $m\angle A + m\angle B + m\angle C =$ _____.



Example 1 *Find an Angle Measure*

Given $m\angle A$ – 35° and $m\angle B$ 85°, find $m\angle C$.



Solution

$m\angle A + m\angle B + m\angle C =$ _____	**Triangle Sum Theorem**
_____ + _____ + $m\angle C =$ _____	**Substitute for $m\angle A$ and $m\angle B$.**
_____ + $m\angle C =$ _____	**Simplify.**
$m\angle C =$ _____	**Subtract _____ from each side.**

Answer $\angle C$ has a measure of _____.

Follow-Up **In Example 1, suppose a student found $m\angle C$ by calculating $180° - 35° - 85°$.**

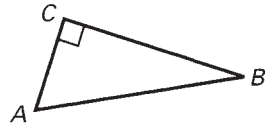
Does this method work? Explain.

Does this method use the Triangle Sum Theorem? Explain.

COROLLARY TO THE TRIANGLE SUM THEOREM

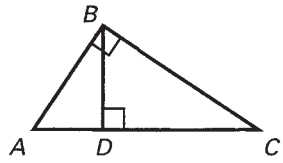
Words The acute angles of a right triangle are _____.

Symbols In $\triangle ABC$, if $m\angle C = 90°$, then $m\angle A + m\angle B =$ ____.



Example 2 ***Find an Angle Measure***

$\triangle ABC$ and $\triangle BDC$ are right triangles. Suppose $m\angle ABD = 35°$. Find $m\angle DAB$.



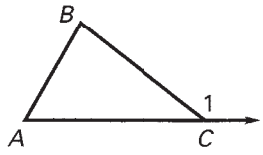
Solution

$m\angle DAB + m\angle ABD =$ ____	**Corollary to the Triangle Sum Theorem.**
$m\angle DAB +$ ____ $=$ ____	**Substitute for $m\angle ABD$.**
$m\angle DAB =$ ____	**Subtract ____ from each side.**

THEOREM 4.2: EXTERIOR ANGLE THEOREM

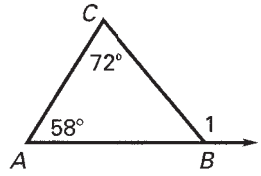
Words The measure of an exterior angle of a triangle is equal to the _____ of the measures of the two nonadjacent _____ angles.

Symbols $m\angle 1 = m\angle A +$ _____



Example 3 ***Find an Angle Measure***

Given $m\angle A = 58°$ and $m\angle C = 72°$, find $m\angle 1$.



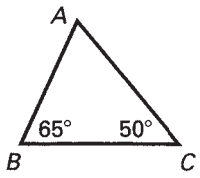
Solution

$m\angle 1 =$ _____ $+$ _____	**Exterior Angle Theorem**
$m\angle 1 =$ ____ $+$ ____	**Substitute.**
$m\angle 1 =$ _____	**Simplify.**

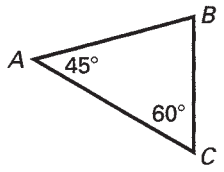
Answer $\angle 1$ has a measure of _____.

Checkpoint **Complete the following exercises.**

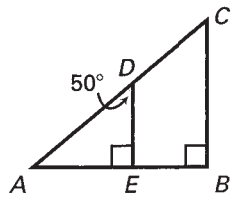
1. Find $m\angle A$.



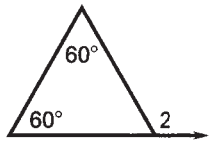
2. Find $m\angle B$.



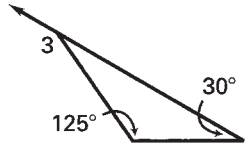
3. Find $m\angle C$.



4. Find $m\angle 2$.



5. Find $m\angle 3$.



6. Find $m\angle 4$.